REMARKS

Reconsideration of the application is respectfully requested for the following reasons:

1.   Amendments to Claims

The claims have been amended to correct grammatical and idiomatic errors, as required in item 4 of the Official Action, and to correct the antecedence error noted in item 3.

In addition, claims 1, 2, and 9 have been amended to delete the phrase "multi-wavelength-oscillating in an envelope wavelength range," "maximal value," and "minimal value," in order to overcome the rejection under 35 USC §112, 2nd Paragraph.

It is noted that, instead of adopting the Examiner's suggestion of reciting ". . .to adjust an inter-mode spacing of oscillation modes. . .," claims 1 and 9 have been amended to recite the step of:

> —. . .adjusting *a radius of* the PQR laser to increase an *inter-mode spacing (IMS)* of oscillation modes. . .—.

This amendment is clearly supported by page 12, lines 1-2 of the original specification, which state that:

> Thus, *reducing the radius R* of the PQR laser can achieve *adjustment* of the oscillation mode wavelength and the **IMS** of the PQR laser, ...

Because the amendments to the specification and claims are formal in nature and/or supported by the original specification as described above, it is respectfully submitted that the amendments do not involve "new matter."

2.   <u>Rejection of Claims 1-6 and 9-11 Under 35 USC §103(a) in view of Bae *et al.,* *Photonic Quantum Corral, Carrier Ordering, and Photonic Quantum Dot/Ring Device* (the Bae Publication) and Han *et al., InGaAs-AlGaAs-GaAs Strained-Layer Quantum-Well Heterostructure Circular Ring Lasers* (the Han Publication)</u>

This rejection is respectfully traversed on the grounds that the Bae and Han publications fail to disclose or suggest adjustment of the **radius** of the PQR laser to reduce its **power consumption**, as now claimed.

> As explained in lines 14-22 on page 12 of the original specification:

> ...the ratio of the **power consumption** of the LED to that of the PQR laser can be derived by the following Expression 6:

> [Expression 6]

> where, n represents the number of oscillation modes in the entire envelope of the PQR laser, and **depends on the radius R of the PQR laser**, as described above. Specifically, the value n is the number of discrete modes included in the FWHM of the envelope of the PQR laser, and is 7 in the case of FIG. 3. It is preferred that the value n be minimal, that is, 1 (page 12, line 14-22),

Neither the Bae publication nor the Han publication discloses this relationship between **power consumption** and **radius**, much less recognizes that power consumption can be reduced by adjusting the radium of the PQR laser. As explained on page 12, line 24 to page 13, line 3 of the original specification:

> Where it is assumed that   is 1, it is possible to obtain a power gain

> corresponding to 9 times the power gain of the LED. Such a gain increases gradually *as the <u>radius</u> R of the PQR laser is reduced.* This means that the *power required* in the PQR laser to emit light of an identical color to that of the LED *is reduced.*"
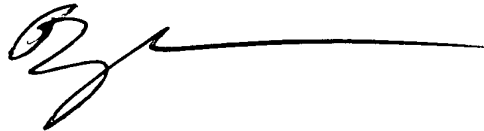
While the Bae publication provides general background on the photonic quantum ring and discusses linewidth narrowing, it does not disclose or suggest any sort of power reduction or relationship between inter-mode spacing (IMS) and PQR radius. The Han publication discusses a relationship between outer radius of the ring laser and laser threshold current density and peak emission wavelength but also does not disclose or suggest a relationship between radius and power gain or consumption. Consequently, neither the Bae nor the Han publication could possibly have suggested the claimed invention to one of ordinary skill in the art, whether considered individually or in any reasonable combination.

Having thus overcome each of the rejections made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,

BACON & THOMAS, PLLC

By: BENJAMIN E. URCIA
Registration No. 33,805

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BACON & THOMAS, PLLC
625 Slaters Lane, 4th Floor
Alexandria, Virginia 22314

Telephone: (703) 683-0500

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